



MILHOUSE

IT'S TIME TO GET THE LEAD OUT

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EXECUTIVE SUMMARY

Exposure to lead in drinking water can have devastating health consequences. The safest solution is to remove all lead pipes, fixtures, and solders from our drinking water distribution system. This will require significant planning, funding, community outreach, and political will.

The U.S. Environmental Protection Agency estimates that up to

10 million households & 400,000 schools and childcare centers have drinking water service lines or other fixtures containing lead.



We can address this lingering public health crisis with a clear vision for lead-free water systems and a heightened sense of urgency. We must prioritize replacing our outdated lead service lines with modern infrastructure to provide clean, safe drinking water for all. In the United States, we have the financial means and the technology to remove lead drinking water service lines. What's needed now are leaders to ensure it is prioritized and done with urgency to protect the health of our current and future generations.



INTRODUCTION

Lead has been present in drinking water since the invention of plumbing. The symbol for lead is Pb, from the Latin word “plumbum.” The Romans used lead pipes to carry water to their cities and within building plumbing systems. Lead poisoning was common in ancient Rome partly due to ingesting lead through water supplies. The toxic effects of lead have affected communities through the ages, and some historians credit lead poisoning from drinking water pipes as a contributing factor in the demise of the Roman Empire.

Lead

is a poisonous neurotoxin and exposure to lead through public water supplies is a critical public health concern.

As late as the 20th century, it was still a common plumbing practice to use lead service pipes and lead solder on copper service pipes leading into homes, offices, and commercial buildings to supply drinking water. By the mid-1980s, safe drinking water research revealed that water chemistry and water treatment chemicals could strip the lead from these service lines and cause the lead to release into the drinking water, where the public would consume it. Lead is a poisonous neurotoxin and exposure to lead through public water supplies is a critical public health concern. **To ensure all citizens have access to clean, affordable water, municipalities should take action now to fully replace all lead service lines in their communities while prioritizing the most vulnerable.**

HOW LONG HAVE WE BEEN USING LEAD?

Although the use of lead pipes for water distribution has a centuries-old history, the installation of lead pipes in the United States on a major scale began in the late 1800s, particularly in larger cities.¹ By 1900, more than **70%** of cities with populations greater than 30,000 used lead water lines.¹ Although lead was more expensive than iron (the material of choice until that time), lead pipes had two significant advantages over iron ones: they lasted much longer than iron (about 35 years compared with 16) and, because they are more malleable, they could be more easily bent around existing structures.¹





WHEN WAS LEAD DETERMINED TO BE A TOXIN?

By the late 1800s in the United States, the use of lead pipes for carrying drinking water was a well-known cause of lead poisoning. By the 1920s, many cities and towns prohibited or restricted their use. By 1930 few lead water pipes were being installed in the United States.¹

CURRENT REGULATIONS REGARDING LEAD PIPES

In 1974, Congress passed the Safe Drinking Water Act, but it was not until 1986 that the installation of lead pipes was finally banned by law. Though they are no longer installed, legacy lead piping remains in service in many communities across the country. The Safe Drinking Water Act (**SDWA**) allows individual states to set and enforce their drinking water standards as long as those standards are at least as stringent as the EPA's national standards. In 1991, the EPA issued the Lead and Copper Rule, which requires water systems to minimize lead and copper levels in drinking water, primarily by reducing water corrosivity through corrosion-control treatment of water. To comply, many municipalities and utilities began adding corrosion-control chemicals at their treatment plants to coat the lead pipes to prevent lead from leaching into the treated water supplied to the consumer's tap. While this technique can make water systems compliant with the regulations, it does not remove the lead source nor guarantee the elimination of lead from the water. In 2022, EPA issued the Revised Lead and Copper Rule, guiding the development and maintenance of water service line inventory. This revision aims to develop inventories and provide states with the information needed for oversight and reporting to EPA. The information provided gives essential information to help water systems comply with the Lead and Copper Rule Revisions requirement to prepare and maintain an inventory of water service line materials by October 16, 2024.

HEALTH EFFECTS OF LEAD

Water itself does not naturally contain lead. Our drinking water can become contaminated with lead when old lead service lines corrode. According to the Environmental Protection Agency (**EPA**) and the Centers for Disease Control and Prevention (**CDC**), there is no known safe lead level in a child's blood. The most vulnerable members of our society regarding lead exposure are children and pregnant women. Even at very low levels, exposure to lead in children has been linked to nervous system damage, learning disabilities, and various other health concerns. Adults can also suffer from lead exposure, resulting in increased blood pressure and decreased kidney function.





SOCIAL EQUITY

Access to safe drinking water should be a fundamental human right; however, clean, lead-free water is not being provided to our communities in a socially equitable way. According to the Metropolitan Planning Council, people of color in Illinois are up to twice as likely as white Illinoisans to live in the communities where nearly all of Illinois' lead service lines are located. Many who live in areas with high concentrations of lead service lines cannot afford equal access to water filters and bottled water. They are left with contaminated tap water as their only option.

FUNDING OPTIONS

The Bipartisan Infrastructure Law will invest \$55 billion to expand access to clean drinking water for households, businesses, schools, and child care centers across the country. From rural towns to struggling cities, the legislation will invest in water infrastructure and eliminate lead service pipes, including in Tribal Nations and disadvantaged communities that need it most. With the passage of President Biden's Infrastructure Investment and Jobs Act (IIJA), \$15 billion is earmarked for replacing lead pipes over the next five years. Of this amount, 49% will be capital forgiveness loans (essentially grants) for disadvantaged communities to ensure affordability.

Additionally, \$9 billion in supplemental Drinking Water State Revolving Loan Funds (DWSRF) can be applied to lead service line replacements over this period. Water Infrastructure Finance and Innovation Act (WIFIA) funding over the last two years has prioritized lead service line replacements with an emphasis on vulnerable populations and historically underserved communities. The Biden administration also seeks additional money in the pending **Build Back Better Act** to reduce lead hazards in public housing and low-income communities. There is also funding available through the Water Infrastructure Improvements for the Nation (WIIN) Act, Community Development Block Grants (CDBG), Healthy Homes Initiative (HHI) as well as a host of state and local grant programs that can help fill funding gaps and lower lead service line replacement costs for customers.


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COST

The cost to public water suppliers and homeowners is one of the most significant barriers to achieving large-scale full lead service line replacements. Full lead service line replacement costs vary by region. They are significantly impacted by local factors such as



terrain



distance from the main to the home



labor rates



material costs



governmental regulations



In many cases, homeowners have been asked to share in the full lead service line replacement cost when the public water supplier does not own the service line portion (typically from the curb into the home). Nationally, the costs per service line replaced can range from \$1,200 to over \$12,000, but on average are somewhere around \$5,000 each. This cost negatively affects social equity, as many homeowners may not be able to afford their portion of the replacement costs, leaving their privately-owned lead service lines in place.

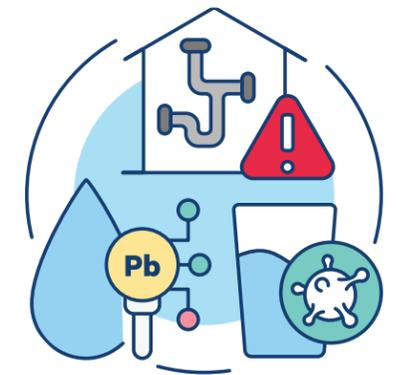




CHALLENGES WITH CURRENT APPROACHES

Many public water suppliers have implemented programs to replace lead piping in their water systems. The replacement cost can be high, so lead pipes have not been replaced across the board. Often, homeowners are responsible for the pipes from their home to their property line (typically the curb or sidewalk), making them responsible for the financial cost of that replacement portion. Those who cannot afford the cost leave their lead service lines in place or receive a partial replacement (from their property line to the water main beneath the street), which has shown actually increases in the amount of lead in the water for a time.

The public water supplier does not own the entire system in many communities. Their authority to make improvements may end at the water main, curb stop, meter, or the customer's property line. In these situations, the public water supplier may have to get the customer's consent to replace their portion of the lead service line. Where homes are occupied by tenants or are vacant, identification of and communication with the homeowner may be difficult. This can cause significant delays in scheduling and increase the cost for that replacement as it may have to be done out of sequence, with construction crews having to remobilize for that single location.



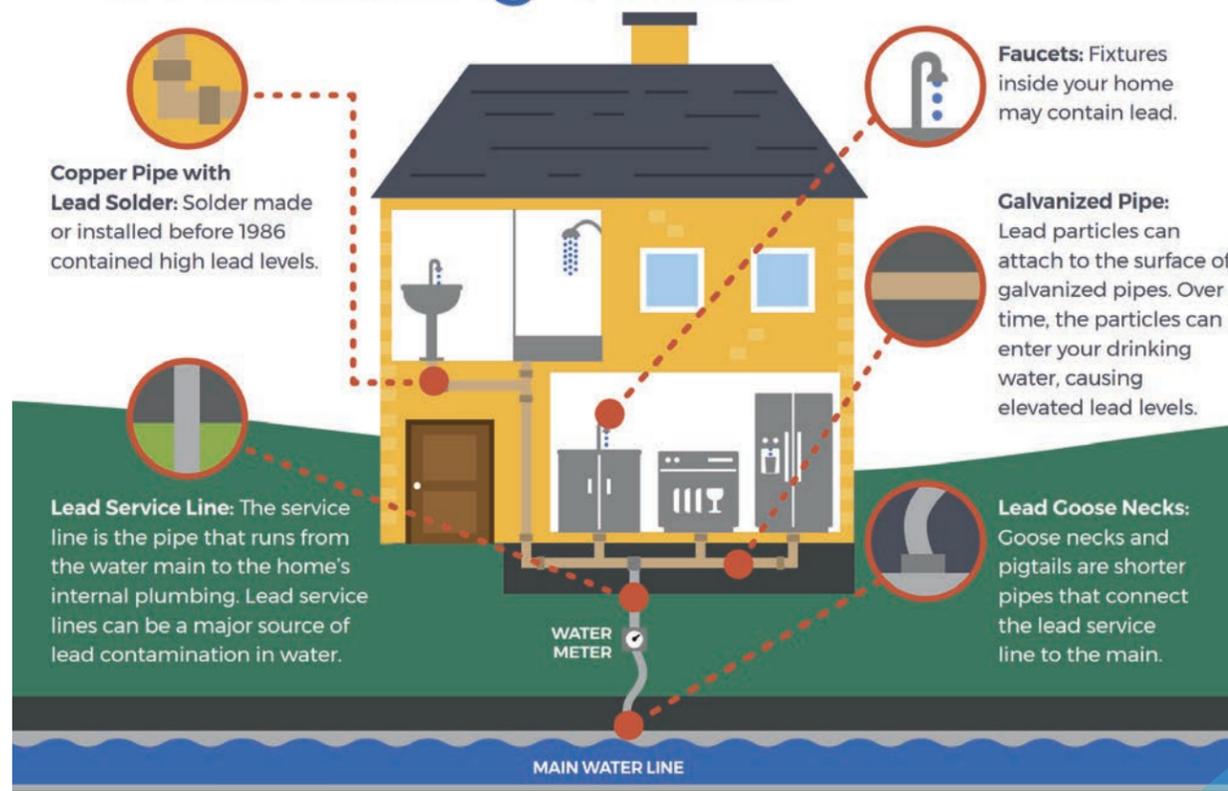
RECOMMENDED APPROACHES

Where possible, the most efficient and equitable way to approach a full lead service line replacement program is to **make it free to the customer.**

This allows everyone to participate regardless of their ability to cover the cost. It also facilitates prioritizing the most vulnerable and helps promote environmental justice. Where the public water supplier does not own the entire system up to the customer's home, there are approaches that can be taken to change the ownership structure of the water system, allowing the public water supplier to conduct a complete replacement from the main to the home and cover the entire cost of the project.

Along with making the program free to customers, initiating ordinances that mandate the replacement of all lead service lines gives the public water supplier the legal authority to plan and execute the work most efficiently, eliminating the complicated process of getting individual homeowner consent to conduct the work. This approach has proven to significantly reduce the duration of full replacement programs across the country.

Sources of LEAD in Drinking Water



https://www.epa.gov/sites/default/files/2017-08/documents/epa_lead_in_drinking_water_final_8.21.17.pdf



CONCLUSION

We need bold and brave leaders to understand the critical and immediate threat that lead service lines pose to communities across the country. The federal government has renewed its focus on infrastructure, making funds available for critically needed improvements, including removing lead service lines. **The time is now** to take action to eliminate the public health hazard that lead service lines continue to inflict on our communities.

Milhouse manages infrastructure programs for various industries, including water/wastewater, transportation, gas, and power. We have experts on staff that can provide assessments, planning, management, and community outreach, and can help you select the best funding option for your unique situation.



References

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2. https://www.epa.gov/sites/default/files/2017-08/documents/epa_lead_in_drinking_water_final_8.21.17.pdf (image)
3. Morris, Vincent. DC Water, 6 Dec. 2018, <https://www.dewater.com/whats-going-on/news/new-district-lead-service-line-replacement-program-offers-historic-opportunity>. Accessed 26 Aug. 2022. (image)

About Milhouse

Milhouse is a full-service engineering, construction and program management firm offering expertise in civil, mechanical, electrical, structural and environmental engineering. We deliver creative solutions to complex problems around the globe. Where others just see another project, we are driven by a desire for greatness—for our clients and our communities.

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